Infectious Polyneuritis

A Disease to Be Distinguished from Poliomyelitis

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• **Fourteen cases of infectious polyneuritis of a kind not previously reported in this country were observed in Los Angeles—three of them in hospital personnel. The clinical features at onset were headache, fever, dizziness of peculiar order, weakness and aching muscles. Motor weakness then developed, more severe in the proximal muscle groups and more often in the lower extremity. Sensory changes were also present. In two cases, debility was so severe as to necessitate prolonged inactivity. The condition was observed in 13 females (one a child) and one man. The age range was 10 to 65 years.**

Similarity of this illness to one reported in England in 1954 was noted.

Treatment included administration of multiple vitamins, B_{12} and thiamine chloride. Recovery occurred in from one week to over ten months.

IN THE SPRING AND EARLY SUMMER of 1956, an illness was observed with clinical features resembling those of poliomyelitis in many ways. In June a report of seven cases was presented at a staff meeting at Cedars of Lebanon Hospital. In the next few weeks an additional four patients with the illness were observed. While a fuller report was being prepared for publication, the syndrome seemed to pass away. Hence the report, having lost much of its import, was set aside. However, three cases in which symptoms closely resembled the syndrome of 1956 were observed in the spring of 1957, making the report once more of significance.

The disease is a polyneuritis with predominantly motor changes, but often with sensory changes also. At a time when physicians generally are on the alert for poliomyelitis, it becomes important to present a condition which must be considered in the differential diagnosis of an infectious disease associated with muscular weakness.

In the series of cases in 1956 all but one of the 11 patients had a clear-cut history of an infection, with symptoms closely paralleling those of the then current "bug of the month"—fever, malaise, dizziness, and possibly headache, cough, nausea and vomiting. The illness was in general protracted, the symptoms—other than the muscular weakness—lasting for from one to three weeks. Both motor and sensory deficits—which lasted up to several months—were noted usually during the acute phase but also as long as two months after the original illness. The dizziness, which was so often mentioned, was described as a light-headed, blacking out feeling when walking fast, bending over, or turning corners—more giddiness than true vertigo.

REPORT OF 11 CASES IN 1956

CASE 1. A 26-year-old woman physiotherapist was seen in April, 1956, with complaint of fever, a slightly productive cough, malaise, dizziness and a fainting episode followed by a severe headache. On the fifth day of the illness, and the day following the fainting episode, she mentioned feeling generally weak. On examination it was observed that there was definite weakness of the extensors, flexors and rotators of the right hip, of the flexors and extensors of the right knee and of the right plantar flexor. The patient was put in hospital with a tentative diagnosis of neuronitis, but the possibility of poliomyelitis weighed heavily on both patient and physician. However, the cerebrospinal fluid protein and cell content were not abnormal. Nor were there abnormalities as to blood examination, urinalysis, heterophil agglutinins or x-ray films of the spine. Slight but definite sensory changes in the form of hypesthesia of the right leg and perianal region were noted. They persisted for a week. After three days in the hospital, weakness of the left leg, particularly of the hip flexors, was noted for the first time. By the sixth day in hospital, muscle strength began to improve in the right leg. A few days later improvement began in the left also. As strength returned, physiotherapy in the form of active and passive exercise was begun. The left leg soon was normal again and over the ensuing three months the right leg gradually returned to normal. During that time the patient often complained of aching pains in the right thigh when she overdid. During convalescence there was an episode of sciatic neuralgia which lasted two days.

An electromyogram made two weeks after onset showed polyphasic motor units, and another made five weeks later showed denervation fibrillations as well—phenomena consistent with peripheral neuritis.

CASE 2. In early April, quite by accident, winging of the right scapula was noted in a 24-year-old nurse who worked in the department of rehabilitation. On questioning she recalled that in late February she

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had noted malaise, weakness, dizziness, slight fever and pain between the scapulae. Upon examination, weakness of the right deltoid muscle, serratus anterior and biceps was noted. Hypesthesia was observed about the right shoulder. In May, slight bilateral foot drop was first noted by the patient and at that time weakness of all movements of both lower extremities—about the hips, knees and ankles—was noted. An electromyogram of the right deltoid and biceps showed polyphasic motor units and denervation fibrillations—conditions consistent with peripheral neuritis. Over the next three months there was a progressive return to normal muscle strength.

CASE 3. A 35-year-old drug detail man, with no history of preceding illness, had rather sudden onset of pain on the right side of the neck going down the shoulder and into the right arm. Later the patient noticed easy tiring of the arm. Upon examination, it was observed that there was decided weakness of the right deltoid and lesser weakness of the biceps, the serratus anterior and the dorsiflexors of the hand.

CASE 4. The patient, a housewife, 39 years of age, who had had poliomyelitis in 1947, was observed because of illness that began with the sudden onset of dizziness, nausea, vomiting, severe headache, especially when standing, and generalized weakness. Upon examination pronounced weakness was noted in all muscle groups tested, including those innervated by cranial nerves. There was hypesthesia over most of the body. The right arm and leg (in which there was slight residual weakness from poliomyelitis) as well as the left arm and leg, were so weak that motion could be restrained by the examiner's using only two fingers to hold the various limbs. Pains in the legs, arms and back became a pronounced complaint. Headache lasted a week and dizziness persisted several weeks.

Three weeks after the onset of symptoms the patient complained of a persistent bothersome pain, neuralgic in nature, in the left lower anterior area of the rib cage, near the xiphoid process. This persisted about two weeks.

Four weeks after onset the patient was put in hospital. Results of examination of spinal fluid, of heterophil agglutinin, of blood and of urine were within normal limits. An electromyogram at this time showed denervation fibrillations in the arms and the legs as well as in the neck muscles. No abnormality was seen in roentgen examination of the upper gastrointestinal tract.

Romberg's sign was present. When smog forced the patient to keep her eyes closed, she could not stand or walk. When fluoroscopy was being done for the upper gastrointestinal roentgen examination, the patient needed support to keep from falling.

Five weeks after the beginning of illness, irritation of the right sciatic nerve developed after the patient had sat in a hard chair in a cramped position. This lasted two days. Strength returned very slowly. Three months after the onset of illness the patient could walk only a dozen steps. Pain persisted in the back and legs. Sensation slowly became normal. Edema of the legs, as seen in other paralytic conditions of the lower extremity, became troublesome. Four months after onset the patient moved to another city where she was admitted to a county hospital (because of a condition not related to the illness here reported) and there she received rigorous physiotherapy, first as an in-patient and then as an out-patient. At the time of latest verbal communication with the patient, ten months after the onset of the symptoms here described, she told of remaining weakness.

CASE 5. The patient, an 11-year-old daughter of an anesthetist, in May of 1956, while receiving posture correction exercises was noted to have specific muscular weaknesses. Questioning disclosed an episode of "flu" and frequent episodes of upper respiratory tract infection during the winter, but no real history of dizziness. On examination weakness bilaterally of the deltoids, biceps and triceps as well as the hip flexors and of the external rotators of the right foot was observed. An electromyogram done on the left leg, the only limb tested, showed denervation fibrillations.

CASE 6. The patient, a 10-year-old girl, was first seen in early June with slight fever and malaise. Four days previously, dizziness and aching pains and weakness in the legs had developed. Upon examination, weakness of both the hip flexors and the left internal rotators was noted. Hyperesthesia of the anterior aspect of both thighs was followed by hypesthesia. By the end of two weeks strength and sensation had returned to normal.

CASE 7. A 24-year-old medical secretary in the rehabilitation department of the hospital was admitted to the hospital June 11, 1956, after a fainting episode. She had had fever, cough, malaise, sore throat with laryngitis and dizziness for the three preceding days. Pronounced bilateral weakness of the deltoid muscles, biceps and triceps, and of the hip and knee flexors and extensors was observed. There was hyperesthesia of the lower extremities and in the arms. Romberg's sign was present. Headache and dizziness lasted a week. A substernal pain [similar to the pain in Case 4] developed. Ingestion of antacids did not relieve it. It abated after a few days. During convalescence, signs of sciatic nerve irritation developed and lasted two days. Recovery was slow, requiring rest in bed and absence from work. When last observed, eight weeks after the onset of illness, the patient had slight shoulder weakness and decided hip weakness, although less than previously.

CASE 8. In July a 65-year-old woman had fever, nausea, a lightheaded dizzy feeling, headache and pains in the legs and hips. When the patient was first examined two weeks later, there was weakness of the hip, knee and ankle flexors and extensors bilaterally. The muscles gradually returned to normal over a period of six weeks.

CASE 9. In late June a 12-year-old girl complained of malaise, generalized weakness, dizziness and intermittent epigastric pain with anorexia of a week's

duration and fever for one day. She had one plus bilateral hip flexor weakness with hyperesthesia of the left calf. The changes lasted three weeks.

CASE 10. A 21-year-old woman was examined three days after onset of sore throat, chilliness, fever, headache and dizziness. The tonsils were enlarged and covered with purulent exudate, and the uvula and palate were edematous and red. There was two plus weakness of the right deltoid muscle and one plus weakness of the right biceps and of the hip flexors bilaterally. Slight hyperesthesia of the lateral side of the right calf was noted. Within a week motor and sensory abnormalities had cleared. A heterophil agglutination test done ten days after onset gave positive reaction in dilution of 1:224.

CASE 11. A 24-year-old woman was seen in June with fever, dizziness and slight weakness of the right deltoid. This cleared in two weeks.

New cases were not seen after early July although every patient with a clinical picture suggesting an acute infectious process was carefully screened with motor and sensory examinations.

It was not until May 29, 1957, that the next case was seen. In the ensuing month two more cases were found.

THREE CASES IN 1957

CASE 12. A 31-year-old housewife was well until sudden onset of headache, sore throat, fever, weakness, a shaking chill and dizziness. Seven hours after symptoms began she was examined by a physician. She then had general aching of muscles so severe as to require 100 mg. of Demerol (meperidine hydrochloride) for relief. A feeling of numbness followed, greatest in the arms and legs. The patient was put in hospital and when she was examined there she appeared acutely ill. The temperature was 102° F. The throat was reddened. Generalized hyperesthesia and apparent weakness in the limbs were noted. Reflexes were active. By the next day, hyperesthesia had disappeared. There was three plus weakness of the flexors, extensors and rotators of the left hip and two plus weakness of the right hip. Reflexes were depressed. The result of a heterophil agglutination test was negative. A stool culture, done because of some diarrhea, showed salmonella muenchen and agglutination studies for salmonella showed a 1:40 titer in the Kauffmann-White C1-C2 group. However, the patient's daughter was found to have the same organism in her stool. The patient was regarded as a carrier and the organism was not felt to be causative. The spinal fluid pressure and the content of the fluid were within normal limits. An electromyogram showed changes compatible with peripheral neuritis, even in muscle groups which seemed clinically uninvolved. Headache lasted three days. As in two cases previously described, lower sternal pain developed; it lasted two days. Over the next six weeks the strength of muscles gradually returned to normal, and an electromyogram showed commensurate improvement.

CASE 13. In May, a 25-year-old woman had chilliness, fever and severe headache for several days and dizziness which persisted for a week. In the three weeks ensuing she had aching in the legs, weakness and continuing fever. When the patient was first examined by the author three and one half weeks after onset, there was two plus weakness of the left hip flexor and slightly less weakness of the internal rotators. On the right the weakness was somewhat less. An electromyogram was compatible with peripheral neuritis. Six weeks after onset of illness, strength was almost normal.

CASE 14. On June 25 a 39-year-old woman had sudden onset of sore throat, headache, fever, dizziness and muscular aches. Weakness of the hip flexors, extensors and rotators, and of the knee extensors and flexors, greater on the right than left, was noted, and there was also hyperesthesia of the left thigh and calf. Improvement was noted in the 17 days the patient was observed up to the time of this report.

DISCUSSION OF CASES

The age range of patients was 10 to 65 years. Only one of the 14 patients was a man. Thirteen had a definite history suggestive of acute infection. Twelve had dizziness and aching muscles. All had motor changes, five of them in both the arms and legs, two in the arms alone, seven in the legs alone; symmetry of motor involvement was present in the arms in three cases and the legs in 12. In nine cases definite sensory changes were noted. Three patients had a lower sternal pain which was felt to be neuralgic. In three cases signs of sciatic nerve irritation developed; this reflected the hypersensitivity and increased irritability of the nerve. Electromyograms were made in seven cases and all were confirmatory of neuritis. Heterophil agglutination tests were done in seven cases; in only one was the reaction positive. Lumbar puncture was done in four cases; no abnormality was noted in any of them.

As was noted, 13 of the 14 patients were female. The case of the man was the only one in which there was not a history strongly suggestive of infection, and possibly the disease in that instance was traumatic radiculitis, rather than infectious neuritis. During the period covered many male patients with various acute infections were seen, some definitely fitting the pattern of headache, fever, and dizziness; yet none of them had muscle weakness.

Reflexes were normal or depressed.

Proximal muscle groups were consistently affected more frequently and more severely than distal groups.

The two most severely affected patients (Cases 4 and 7, 1956) had Romberg's sign. It is believed this did not indicate posterior column disease but, rather, involvement of proprioceptive nerves.

DIAGNOSIS

Important factors in clinically establishing the diagnosis and in differentiating it from poliomyelitis are:

1. Motor weakness which involves nerves derived from adjacent neurotomes rather than involvement of several neurotomes in a spotty fashion.
2. Definite sensory changes, which are neither spotty nor very transient, such as may be observed (but usually are not) in poliomyelitis.
3. Symmetry of pattern.
4. Antecedent or concomitant infectious state.
5. Other symptoms—such as headache, dizziness and muscle aches—which fit the syndrome.
6. Kernig's and Brudzinski's signs not present, and no nuchal rigidity.

Results of laboratory studies further clarify the diagnosis—no abnormality of the spinal fluid examination, and an electromyogram showing polyphasic motor units and denervation fibrillations.

Since the patient seldom complains of specific weakness, the diagnosis may be overlooked unless the physician has an awareness of the condition and carries out routine testing of muscle strength and of sensation in each patient with history of infectious disease. If weakness is found, other studies can be carried out.

ETIOLOGY

No attempt has been made to determine the causative organism. The fact that in three of the cases observed in 1956 (Cases 1, 2 and 7) the patients worked in the same department suggests it is of contagious nature.

A relationship to infectious mononucleosis is suggested because of the similarity in the clinical course in Case 10 (1956), in which there was positive reaction to heterophil agglutination test, with the other cases. Guillain-Barre's syndrome is unlikely for the results of spinal fluid examination were within normal limits. The Coxsackie virus certainly has to be considered among the possibilities, especially since the polyneuritis occurred during poliomyelitis season, when the Coxsackie virus is also prevalent.

In a review of recent literature no report was found of similar cases in this country. However, Macrae and Galpine[1] reported 13 cases (amongst 49 nurses) of an "illness resembling poliomyelitis" in a Coventry hospital. The clinical features, beginning with an acute infection leading to weakness and sensory changes, were similar to those in the series herein reported. Results of laboratory, spinal fluid and electromyographic studies were also similar. Studies done by Macrae and Galpine on the stool, as well as additional studies for leptospiral infection, lymphocytic choriomeningitis, poliomyelitis and other virus infections, failed to detect the etiologic agent. In the Coventry series all the patients were females. It can be postulated that the two illnesses bear a close kinship.

TREATMENT

Therapy is nonspecific, being that used in most neuritides—multivitamins orally and parenterally, thiamine chloride 100 mg. three times daily, and vitamin B_{12}, 1000 mcg. daily at first and then two or three times weekly. Rest in bed was maintained while the weakness was progressive. Gradual ambulation and physiotherapy were employed as strength increased.

PROGNOSIS

The rate of recovery seems to be in proportion to the degree of severity. Mild cases cleared in two weeks, moderately involved cases in a few months. In the two most severe cases, unfortunately, the patients moved away and close contact was lost. But progress in these two was much slower than in the less severe cases, in which improvement began usually in less than a week and proceeded steadily. In the severe cases (Cases 4 and 6, 1956) it was several weeks before signs of improvement were noted, and then return to normal progressed very slowly. In these two there was prolonged disability requiring rest in bed for many weeks.

The sensory changes clear up faster than the motor.

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ADDENDUM

After this paper was submitted, three more cases were observed. All the patients were women between 20 and 30 years of age. The clinical course was similar to that noted in moderately involved cases.

REFERENCE

1. Macrae, A. D., and Galpine, J. F.: An illness resembling poliomyelitis observed in nurses, Lancet, 2:350-352, August 21, 1954.